COMPLETE LISTING OF CLAIMS

Claims 1 – 45 (Canceled)

46. (New) A method of forming a copper wiring line, comprising:

providing a workpiece having a resist layer and a metal seed layer, said resist layer having a recessed region and an adjacent field region, said metal seed layer covering at least a portion of said workpiece, including in said recessed region and on said field region;

then causing a plating accelerator to become attached to said metal seed layer selectively in said recessed region, with relatively little or no accelerator attached to said metal seed layer in said field region, thereby forming an acceleration region in said recessed region;

then plating copper on said workpiece, wherein said accelerator selectively attached in said acceleration region increases a rate of copper plating in said acceleration region relative to a rate of copper plating in said field region;

continuing plating copper until a height of plated copper in said acceleration region is higher than a field copper height in said field region; and

then after said plating copper, removing metal substantially completely from said field region by removing metal substantially isotropically from said acceleration region and said field region.

47. (New) A method as in claim 46 wherein said continuing plating copper comprises:

plating copper until the difference between a height of plated copper in said acceleration region and a field copper height in said field region approximates a desired final thickness of copper wiring line.

48. (New) A method as in claim 47 wherein said continuing plating copper comprises:

plating copper until the difference between a height of plated copper in said acceleration region is at least 3 μm higher than a field metal height in said field region.

49. (New) A method as in claim 46 wherein said removing metal substantially isotropically comprises:

isotropic etching of metal from said said acceleration region and said field region.

50. (New) A method as in claim 49 wherein said isotropic etching of metal comprises:

isotropic wet etching of metal from said said acceleration region and said field region.

51. (New) A method as in claim 46 wherein said removing metal from said field region does not substantially include chemical mechanical polishing (CMP), subtractive etching, or masking said workpiece.

52. (New) A method as in claim 46 wherein said providing said workpiece comprises:

providing a workpiece having a recessed region and an adjacent field region;

then depositing a metal seed layer on said workpiece, including in said recessed region and on said field region.

53. (New) A method as in claim 52, further comprising :

depositing a metal-containing barrier layer on said workpiece, including in said recessed region and in said field region, before said depositing a metal seed layer.

54. (New) A method as in claim 46 wherein said providing said workpiece comprises:

applying a resist layer to a base layer of said workpiece; and

then patterning said resist layer to form said recessed region and said field region.

55. (New) A method as in claim 46, further comprising:

removing said resist layer from said field region after said removing copper from said field region.

56. (New) A method as in claim 46, wherein causing an accelerator to become attached to said metal seed layer selectively in said recessed region comprises:

globally applying an accelerator film on said metal seed layer; and

then selectively removing at least a portion of said accelerator film from said metal seed layer in said field region.

57. (New) A method as in claim 46 wherein said providing said workpiece comprises:

providing a workpiece having a metal-containing barrier layer on said workpiece, including in said recessed region and in said field region, under said metal seed layer.

58. (New) A method of forming a metal structure in an electronic device, comprising:

providing a workpiece having a resist layer, said resist layer having a recessed region and an adjacent field region;

then causing an accelerator to become attached to said workpiece selectively in said recessed region, thereby forming an acceleration region in said recessed region, with relatively little or no accelerator attached to said workpiece surface in said field region;

then depositing metal on said workpiece, wherein said accelerator attached in said acceleration region increases a rate of metal deposition in said acceleration region relative to a rate of metal deposition in said field region;

continuing depositing metal until a height of deposited metal in said accelerated recessed region is higher than a metal height in said field region; and

then after said depositing metal, removing metal substantially completely from said field region by removing metal substantially isotropically from said acceleration region and said field region.

59. (New) A method as in claim 58 wherein said continuing depositing metal comprises:

depositing metal until the difference between a height of metal in said acceleration region and a field metal height in said field region approximates a desired final thickness of said metal structure.

60. (New) A method as in claim 58, further comprising :

continuing depositing metal until a height of metal in said acceleration region is at least 3 μm higher than a field metal height in said field region.

61. (New) A method as in claim 58 wherein said removing metal substantially isotropically comprises:

isotropic etching of metal from said said acceleration region and said field region.

62. (New) A method as in claim 61 wherein said isotropic etching of metal comprises:

isotropic wet etching of metal from said said acceleration region and said field region.

63. (New) A method as in claim 58 wherein said removing metal substantially completely from said field region does not substantially include chemical mechanical polishing (CMP), subtractive etching, or masking the workpiece.

64. (New) A method as in claim 58 wherein said workpiece comprises a base layer, and wherein said providing said workpiece comprises:

applying a resist layer to said base layer; and

then patterning said resist layer to form said recessed region and said field region.

65. (New) A method as in claim 58 further comprising :

removing said resist layer from said field region after said removing metal from said field region

66. (New) A method as in claim 58, further comprising :

depositing a metal seed layer on said workpiece, including in said recessed region and in said field region, before said causing an accelerator to become attached.

67. (New) A method as in claim 66 wherein said depositing a metal seed layer on said barrier layer comprise:

conducting electroless deposition of said metal seed layer.

68. (New) A method as in claim 66, further comprising :

depositing a metal-containing barrier layer on said workpiece, including in said recessed region and in said field region, before said depositing said metal seed layer.

69. (New) A method as in claim 58 wherein said providing said workpiece comprises:

providing a workpiece having a metal seed layer on at least a portion of said resist layer, including in said recessed region and in said field region.

70. (New) A method as in claim 69 wherein said providing said workpiece comprises:

providing a workpiece having a metal-containing barrier layer on said workpiece, including in said recessed region and in said field region.

71. (New) A method as in claim 58 wherein said depositing metal comprises depositing copper.

72. (New) A method as in claim 58, wherein causing an accelerator to become attached to said workpiece surface selectively in said recessed region comprises:

globally applying an accelerator film on said workpiece surface; and

then selectively removing at least a portion of said accelerator film from said workpiece surface in said field region.

73. (New) A method as in claim 72 wherein said applying an accelerator film comprises:

applying a liquid accelerator solution.

74. (New) A method as in claim 73 further comprising:

after said applying said liquid accelerator solution, removing liquid accelerator solution from said workpiece without substantially removing said accelerator film from said workpiece.

75. (New) A method as in claim 74 wherein said removing liquid accelerator solution from said workpiece comprises:

rinsing said workpiece with liquid solvent, said liquid solvent having a lower concentration of accelerator than a concentration of accelerator in said liquid accelerator solution.

76. (New) A method as in claim 74 wherein said removing liquid accelerator solution from said workpiece comprises:

drying said workpiece.

77. (New) A method as in claim 72 wherein said applying said accelerator film comprises:

applying accelerator to a metallic layer on said workpiece.

78. (New) A method as in claim 72 wherein said applying said accelerator film comprises:

applying accelerator molecules selected from the group consisting of 2-mercaptoethane sulfonic acid (MESA), 3-mercapto-1-propane sulfonic acid (MPSA), mercaptopyruvate, 3-mercapto-2-butanol, 1-thioglycerol, dimercaptopropane sulfonic acid (DMPSA), dimercaptoethane sulfonic acid (DMESA), and salts thereof.

79. (New) A method as in claim 58 wherein:

after said removing metal substantially completely from said field region, remaining deposited metal protrudes above said resist layer.

80. (New) A method of forming a metal structure in an electronic device, comprising:

providing a workpiece having a resist layer, said resist layer having a recessed region and an adjacent field region;

then causing an accelerator to become attached to said workpiece surface selectively in said recessed region, thereby forming an acceleration region in said recessed

region, with relatively little or no accelerator attached to said workpiece surface in said field region;

then depositing metal on said workpiece, wherein said accelerator attached in said acceleration region increases a rate of metal deposition in said acceleration region relative to a rate of metal deposition in said field region;

continuing depositing metal until an accelerated thickness of deposited metal in said acceleration region is thicker than a field thickness of metal in said field region;

then after said depositing metal, removing metal substantially completely from said field region; and

then removing said resist layer from said field region after said removing metal from said field region.

81. (New) A method as in claim 80 wherein said continuing depositing metal comprises:

depositing metal until the difference between an accelerated thickness of metal in said acceleration region and a field thickness of metal in said field region approximates a desired final thickness of said metal structure.

82. (New) A method as in claim 80, further comprising :

continuing depositing metal until an accelerated thickness of metal in said acceleration region is at least 3 μm thicker than a field thickness of metal in said field region.

83. (New) A method as in claim 80 wherein said removing metal substantially completely from said field region comprises:

removing metal substantially isotropically from said acceleration region and said field region.

84. (New) A method as in claim 83 wherein said removing metal substantially isotropically comprises:

isotropic etching of metal from said said acceleration region and said field region.

85. (New) A method as in claim 84 wherein said isotropic etching of metal comprises:

isotropic wet etching of metal from said said acceleration region and said field region.

86. (New) A method as in claim 83 wherein said removing metal substantially completely from said field region does not substantially include chemical mechanical polishing (CMP), subtractive etching, or masking the workpiece.

87. (New) A method as in claim 80, further comprising :

depositing a metal seed layer on said workpiece, including in said recessed region and in said field region, before said causing an accelerator to become attached.

88. (New) A method as in claim 80 wherein said depositing a metal seed layer comprises:

conducting electroless deposition of said metal seed layer.

89. (New) A method as in claim 80, further comprising :

depositing a metal-containing barrier layer on said workpiece, including in said recessed region and in said field region, before said depositing a metal seed layer.

90. (New) A method as in claim 80 wherein said depositing metal comprises depositing copper.

91. (New) A method as in claim 80, wherein causing an accelerator to become attached to said workpiece surface selectively in said recessed region comprises:

globally applying an accelerator film on said workpiece surface; and

then selectively removing at least a portion of said accelerator film from said workpiece surface in said field region.